

REMARKS

Claims 1-74 remain pending in the application. Claims 13-38 have been withdrawn. Non-substantive amendments to claims 1-9 and 11 have been presented for the purpose of clarification. Approval and entry are respectfully requested.

CLAIM REJECTION: 35 U.S.C. § 112, FIRST PARAGRAPH

Claims 1-12 and 39-74 have been rejected under 35 U.S.C. § 112, first paragraph, as failing to provide a written description. Applicant respectfully traverses this rejection.

The Examiner argues that the original disclosure does not support the recitation of a current density of at least 100 mA/cm². Applicant respectfully submits that this amendment is supported in the original disclosure at, for example, page 21, lines 5-26, which refer to a “threshold” current density of 0.1 A/cm², which converts to 100 mA/cm². A “threshold” is a point to be exceeded to begin producing a given effect or result or to elicit a response. In view of the above-cited supporting passage of the original disclosure, Applicant respectfully submits that this ground of rejection is misplaced, and requests withdrawal of the same.

Next, the Examiner argues that the original disclosure does not support the recitation of vibrating the solid to establish stable plasma. Applicant respectfully disagrees. An explanation of how the solid is vibrated, and supporting passages in the original disclosure, are provided below.

The plasma inside a solid, or a plasma solid, remains stable because of a triple resonance phenomenon inside specific materials, which prevents the association of positive particles and electrons. (Page 2, lines 13-16) According to an embodiment of the original disclosure, palladium is selected as the material for carrying out the triple resonance phenomenon. Palladium includes two categories of elementary cells. The first category

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consists of “elementary energy cells” having a volume available for the electrochemical mechanism $2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2 + 31.3 \text{ eV}$. The second category consists of “elementary plasma cells,” which are insufficient in size to form the hydrogen molecule and therefore have only one hydrogen particle therein. The triple resonance phenomenon states that the energy released by hydrogen formation in the elementary energy cells imparts a state of vibration to cathode that forbids the combination of H D T^+ and of electrons inside the elementary plasma cells. (Page 11, lines 7-37) Thus, the elementary energy cells inside the cathode, and the release of energy from hydrogen formation in those cells, are a source or means of vibration.

Applicant also points out that according to the embodiment claimed in claim 41, 44, 47, 50, 53, 56, 59, 62, 65, 68, 71, and 74, the energy production from the hydrogen formation and the resultant vibrations of the cathode metallic atoms may be synchronized, for example, by adding periodic pulses. (Page 15, lines 29-34) The periodic repetition of impulses coordinates the vibrations of the metal. (Page 16, lines 3-14) The impulses may be mechanical, current-density, or sound communicated to the electrode through the liquid solution. (Page 16, lines 14-22; page 21, lines 28-31) The synchronization of energy formation inside the cathode allows the amplitude of the vibration of the metal atoms to be adjusted. (Page 16, lines 23-28)

Applicant notes that the claims do not recite that vibration of the solids alone causes the particles to form into stable plasma. The claims must be read as a whole; a single clause of a claim should not be read in isolation from the rest of the claim. With regard to claim 1, which was specifically identified by the Examiner as subject to this ground of rejection, Applicant points out that claim 1 recites the step of “providing a solid with a lattice of such nature that the solid will allow the creation of stable plasma.” Thus, claim 1 clearly recites features other than the vibration of the solid that contribute to the formation of stable plasma. Applicant respectfully submits that claim 3 in no way contradicts this position. Each of

claims 1 and 3 recites a method of forming stable plasma that specifies the nature of the solid and the presence of vibrations, such as caused by the formation of molecular hydrogen in the elementary energy cells described above. For these reasons, Applicant respectfully submits that this ground of rejection is misplaced, and respectfully requests withdrawal of the same.

SPECIFICATION -- 35 U.S.C. § 112, FIRST PARAGRAPH

The specification has been objected to under 35 U.S.C. § 112, first paragraph, as lacking enablement. Applicant respectfully traverses this rejection.

Applicant respectfully submits that it is for the invention as claimed that enablement must exist, and not some other. *Christianson V. Colt Inds. Oper. Corp.*, 3 USPQ2d 1241 (Fed. Cir. 1987), *vacated on jurisdictional grounds and remanded*, 7 USPQ2d 1109 (1988); *Ratheon Co. v. Roper Corp.*, 220 USPQ 592 (Fed. Cir. 1983). The claims, as amended, all recite that the ionic solution has a pH less than 1.0. The specification teaches this pH range as preferred, and thereby enables the invention as claimed. This is all that is mandated by Section 112.

Further, even if the Examiner's interpretation of the specification as containing inconsistent statements were correct, which Applicant contests and in no way concedes, the specification provides sufficient teachings to practice operative embodiments of the invention without undue experimentation. Applicant respectfully submits that the test for enablement under Section 112 is satisfied even where the artisan is required to conduct experimentation, so long as it is not undue or unreasonable. By the Examiner's own admission, the original disclosure teaches that using a pH less than 1 is preferred. For example, the original disclosure teaches the criticality of using a pH less than 1 at page 10, line 35 to page 11, line 1. Thus, the original disclosure provides strong and unambiguous guidance towards the practice of a pH less

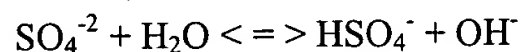
than 1 which, when taken in combination with the other teachings of the original disclosure, would have eased the amount of experimentation, if any, required by one skilled in the art.

For the above reasons alone, Applicant respectfully submits that the Section 112, first paragraph enablement rejection should be withdrawn.

Applicant has repeatedly provided to the Examiner reasonable explanations regarding the specification to explain how and why certain specification excerpts, which the Examiner alleges are contradictory, are in fact not inconsistent with this teaching of criticality. These arguments, which have been presented in prior responses, are incorporated herein by reference.

The Examiner asserts at page 6, penultimate paragraph of the prior Office Action that neither a plasma gas nor gas atmosphere has a pH less than 1. The pertinence of this state is unclear. Applicant has not claimed a gas having a pH less than 1. Applicant has claimed that an ionic solution should have a pH less than 1.

With regard to Pons et al., Applicant incorporates the remarks set forth in the response of April 26, 2004. Applicant maintains that Pons does not disclose the use of a pH less than 1 in an ionic solution. The solution in which the Pons et al. process is carried out does not have a pH less than 1. Pons refers to a lithium sulfate solution. Lithium sulfate is a well-known and recognized basic inorganic chemical. Its introduction into water produces a solution that is weakly basic:



The generation of hydroxide ions is characteristic of a basic solution having a pH greater than 7.

As explained repeated in prior responses, when the pH of the solution is smaller than 1, the concentration of protons available inside the solution is superior to the quantity necessary for the electrochemical mechanism of hydrogen. The excess protons can enter inside the solid

to be stored as plasma. But if the pH is larger than 1, the quantity of protons available will only allow the presence of the electrochemical mechanism. There is no free excess of free protons to be stored as plasma. For further elaboration on this point and its scientific backing, please see pages 33-34 of the April 26, 2004 response.

For all of these reasons, and for the additional reasons asserted in the previous responses, Applicant respectfully submits that the objection to the specification is misplaced, and respectfully requests reconsideration and withdrawal of the same.

CLAIM REJECTION: 35 U.S.C. § 112, FIRST PARAGRAPH

Claims 1-12 and 39-74 have been rejected under 35 U.S.C. § 112, first paragraph for the same reasons as set forth in the objection to the specification.

This rejection is traversed. The remarks presented in response to the Section 112, first paragraph rejection of the specification are incorporated herein. Reconsideration and withdrawal of the rejection are respectfully requested for the same reasons advanced above.

CLAIM REJECTION: 35 U.S.C. § 101

Claims 1-12 and 39-74 stand rejected under 35 U.S.C. § 101, as being inoperative and therefore lacking utility. This rejection is respectfully traversed for the reasons given above and withdrawal of the same is respectfully requested.

The Examiner asserts that the subject application does not disclose features and/or parameters that enable Applicant's invention to be operative to produce plasma in the cathode, yet which are lacking in systems such as Williams et al. and Pons et al. As noted above, Applicant has provided a description in the present specification of sufficient detail to allow one skilled in the art to produce plasma in the lattice of a cathode by following the instant disclosure. The feature/parameter that the Examiner alleges lacking is the pH of less than 1. Applicant has disclosed this feature. Furthermore, Applicant has provided sufficient information so as to enable one skilled in the art to practice the invention without undue experimentation.

Accordingly, reconsideration and withdrawal of this rejection is urged.

CLAIM REJECTIONS -- 35 U.S.C. § 112, SECOND PARAGRAPH

Claims 1-12 stand rejected under 35 U.S.C. § 112, second paragraph.

Applicant respectfully traverses this rejection. All grounds advanced by the Examiner in support of this rejection have been addressed above. The claims have been amended to ensure antecedent basis for the term vibrations.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of this rejection.

CLAIM REJECTIONS – 35 U.S.C. § 102

Claims 1-12, 40, 41, 43, 44, 46, 47, 49, 50, 52, 53, 55, 56, 58, 59, 61, 62, 64, 65, 67, 68, 70, 71, 73, and 74 have been rejected under 35 USC 102 (b) as being anticipated by Silvera et al., Hemmes et al., or Myers.

This rejection is respectfully traversed.

Silvera admits that its process produces a high density of deuterium, not plasma ions:

In summary, we have searched for cold fusion using a very different technique than the more commonly tried electrolysis methods. We believe that we have produced a very high density of D in Pd.

Hemmes “synthesized stoichiometric PdH and PdD in diamond anvil cell.” This method is the same method used by Silvera, and therefore Hemmes is lacking for the same reasons as Silvera.

Meyers introduces deuterium inside the metallic lattice. In Meyers’ own words:

Deuterium was introduced into palladium at atomic ratios greater than one by means of ion implantation at cryogenic temperatures.... Concentrations as high as 1.6 D/Pd were produced by 10 KeV implantation at temperatures of 41 and 81K.

For Pd Implanted at a temperature of 35K, for example, the published depth profiles show a saturation atomic ratio of $D/Pd = 1.3 \pm 0.2$. For Ti at 140 K, a

saturation value of $D/Ti = 2.5$ was found, whereas Z_r at 70 K was reported to retain a remarkable five D atoms per metal atom.

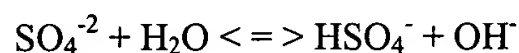
(Abstract, and page 263, column 2)

Thus, Meyers makes clear that stable plasma suitable for use is not established.

Accordingly reconsideration and withdrawal of this rejection is respectfully requested.

Claims 1-4, 7-12, 39-50, and 57-74 have been rejected under 35 U.S.C. § 102(b) as being anticipated by either Pons et al. or Cedzynska et al. This rejection is respectfully traversed.

Pons discloses solutions of 0.1 M and 1 M lithium sulfate. The dissolution of the sulfate in water produces a solution that is weakly basic:



The generation of hydroxide ions is characteristic of a basic solution.

Cedzynska presents a method for consistently achieving a high loading ratio of isotopic hydrogen (i.e., hydrogen atoms or molecules). Cedzynska employs a process of alternately charging and discharging the electrode in a plurality of cycles. The charge-discharge cycles would not allow the loading of sufficient deuterium atoms (from D_2SO_4 in D_2O) to create or store plasma for use.

For these reasons, reconsideration and withdrawal of this rejection are respectfully requested.

Claims 1-4, 7-12, 39-50, and 57-74 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over either Pons et al or Cedzynska et al. in further view of Jouanneau et al or the website allegedly setting forth the relationship between molarity and pH.

The deficiencies of Pons and Cedzynska are discussed above.

The Examiner cites Jouanneau and the web site as allegedly teaching that a molarity of 0.5 will produce a pH less than 1. Applicant respectfully submits that molarity is a measure of the number of moles of a solute in 1 kg of solvent. The pH of the solution will

depend upon the particular solute selected. For example, an aqueous solution having a molarity of 0.5 of a basic solute, such as the lithium sulfate of Pons, will have a pH greater than 7.

Additionally, Jouanneau reports the use of nickel as an anode, not a cathode. Therefore, the metal in the cells is positive and attracts the anions of the ionic solution. The anodic electrochemical process provokes dissolution of the metal and production of oxygen. There is no production of hydrogen on the nickel. The hydrogen is produced in or at the surface of a cathode which has a negative potential to attract the cations H^+ of the ionic solution. In these experiments, the cathode has a very large area by comparison to the surface of the anode (several hundred to one thousand times greater). The purpose of this much greater surface is to avoid the limitation of currents by the cathode. Because of the very large surface, the current density of the cathode is too small to produce plasma inside the platinum.

For these reasons, Applicant respectfully requests reconsideration and withdrawal of the Section 102(b) rejections.

CLAIM REJECTIONS -- 35 U.S.C. § 103

Claims 1-4, 7-12, 39-50, and 57-74 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over either Pons et al or Cedzynska et al., optionally in view of Jouanneau et al. or the website, in further view of Doke et al.

This rejection is respectfully traversed.

The deficiencies of Pons and Cedzynska, taken alone or in combination with Jouanneau et al or the website, have been outlined above. Doke does not overcome these deficiencies. For this reason alone, the Section 103(a) rejection should be withdrawn.

Additionally, Doke describes a cylinder plating type vibrating electrode apparatus used to achieve a higher probability of nuclear fusion. The pure nickel plate is coated with

palladium or titanium (nuclear fusion generating substances). A vibrating body is used to induce vibrations of the cylindrical plated cathode. The apparatus is set inside a deuterium tank (heavy water tank in the original Japanese text). The heavy water passes through a heat exchanger outside the tank to remove the heat energy created by the fusion reactions in the plating at the surface of the cathode.

The pH in this heavy water must be greater than 1 to prevent the titanium from being corroded and dissolved during the cathodic production of hydrogen. The attached passage from Pourbaix, Encyclopedia of Elements shows the effect of low pH on titanium. Using a $\text{pH} > 1$ allows passivation of titanium, thereby protecting the titanium during the electrochemical mechanism. The higher pH of Doke, while necessary to protect the titanium, prevents the creation of plasma of deuterons inside the palladium or the titanium coating at the surface of the cathode. Instead, the HDT atoms are bound to the metallic atoms of the lattice coating.

For these additional reasons, the Section 103(a) rejection of claims 1-4, 7-12, 39-50, and 57-74 should be withdrawn.

Claims 5, 6, and 10-12 have been rejected under 35 USC 102 (b) as being anticipated by any of Bellanger et al. or Schulten et al., in view of either Pons or Cedzynska, optionally further in view of Doke.

This rejection is respectfully traversed.

Bellanger states as follows:

According to the invention, the electrolyte added to the solution containing tritiated water is preferably constituted by alkyl metal hydroxide, such as sodium hydroxide or potassium hydroxide, which makes it possible to prevent to the maximum possible extent the formation of complex ions resulting from radiolysis phenomena and the presence of solvated electrons due to tritium. When sodium hydroxide is used, the electrolyte concentration of this solution is advantageously 1 mol.l^{-1} to 20 mol.l^{-1} .

(Column 4, line 62 to column 5, line 3)

These basic electrolytic solutions of Bellanger have a pH greater than 1, in which plasma cannot be created in palladium.

Schulten employs a layer of palladium coated with iron, zirconium, an iron titanium alloy, iron tantalum alloy, or iron niobium alloy. This cathode membrane is supported on each side by a pair of fitted nickel plates. The thin cathode membrane is placed between an electrolytic solution on one side and molten sodium or molten lithium on the other side. The hydrogen atoms produced on the electrolytic side of the membrane immediately diffuse across the thin membrane. Then, they form hydride with molten lithium or molten sodium on the other side of the membrane. Thus, hydrogen ions will not accumulate inside the cathode membrane of Schulten.

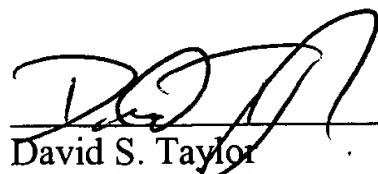
Pons and Cedzynska, taken alone or in combination with Doke, fail to overcome these deficiencies for the reasons advanced above.

For these reasons, Applicant respectfully requests reconsideration and withdrawal of the Section 103(a) rejection.

If, after reviewing the above amendments and remarks, the Examiner believes that any issues remain unresolved, the Examiner is respectfully requested to contact the undersigned, by telephone, to schedule an interview to address such issues.

Finally, Applicant respectfully requests that the Patent Office records be updated to assign new attorney docket no. 7414.220 to this application. Thank you.

Respectfully submitted,



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due to a film of rutile TiO_2 . Taking into account the excellent protective properties of such a film, titanium appears in this figure to be resistant to corrosion in the presence of any non-complexing solutions, with the exception of acid reducing solutions and very oxidizing solutions.

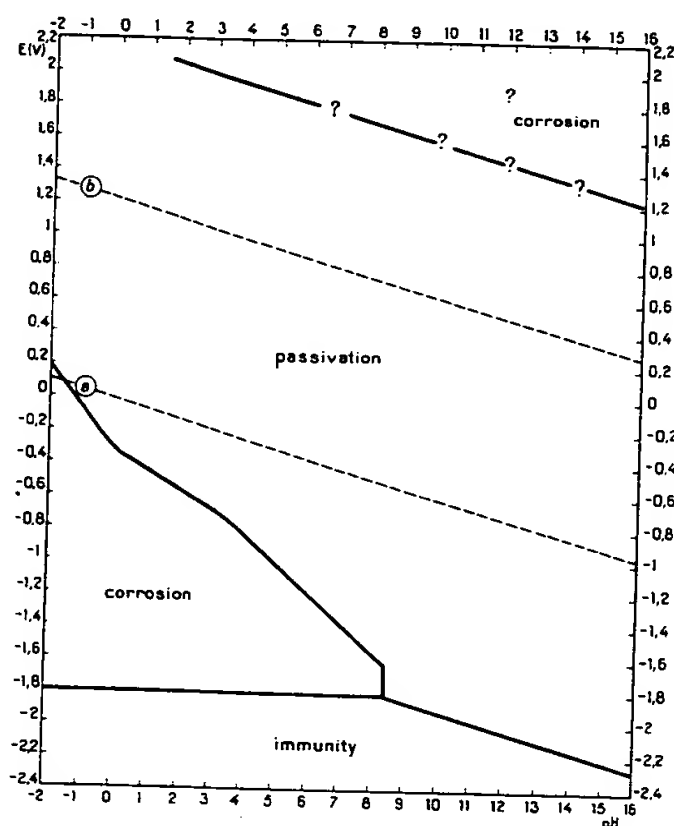


FIG. 3. Theoretical domains of corrosion, immunity and passivation of titanium, at 25°C.
[Deduced from Fig. 1, assuming passivation by the anhydrous oxide TiO_2 (rutile).]

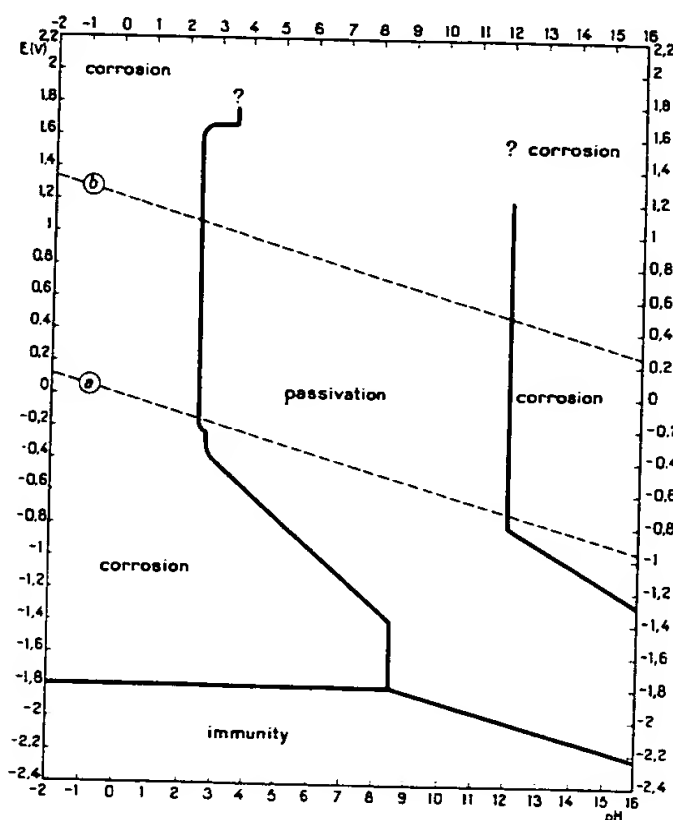


FIG. 4. Theoretical domains of corrosion, immunity and passivation of titanium, at 25°C.
[Deduced from Fig. 2, assuming passivation by the hydrated oxide $\text{TiO}_2 \cdot \text{H}_2\text{O}$.]

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